



Re-usable Water Bottles

Green – Sturdy – Functional

Plastic or Aluminum?



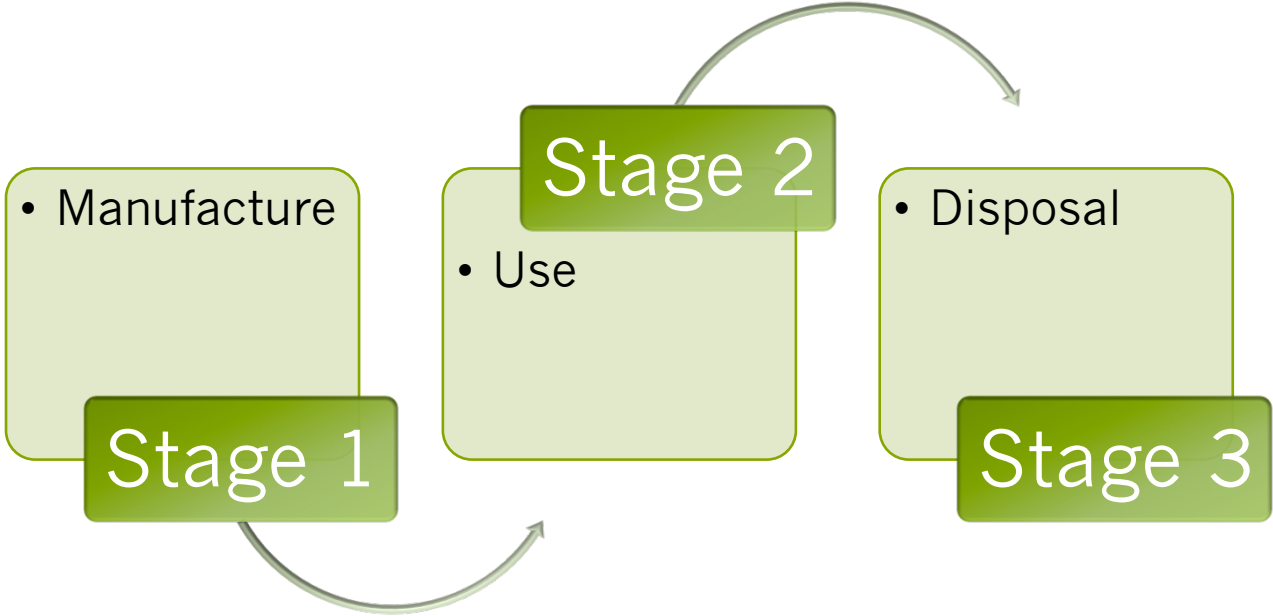
NALGENE



SIGG



Life Cycle Analysis

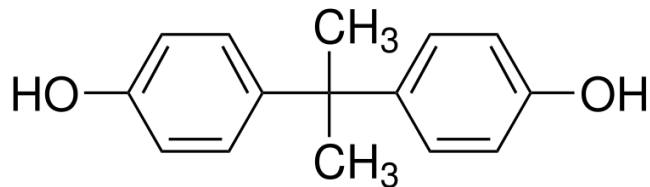


Why NALGENE



General Concern

- BPA (Bisphenol A)

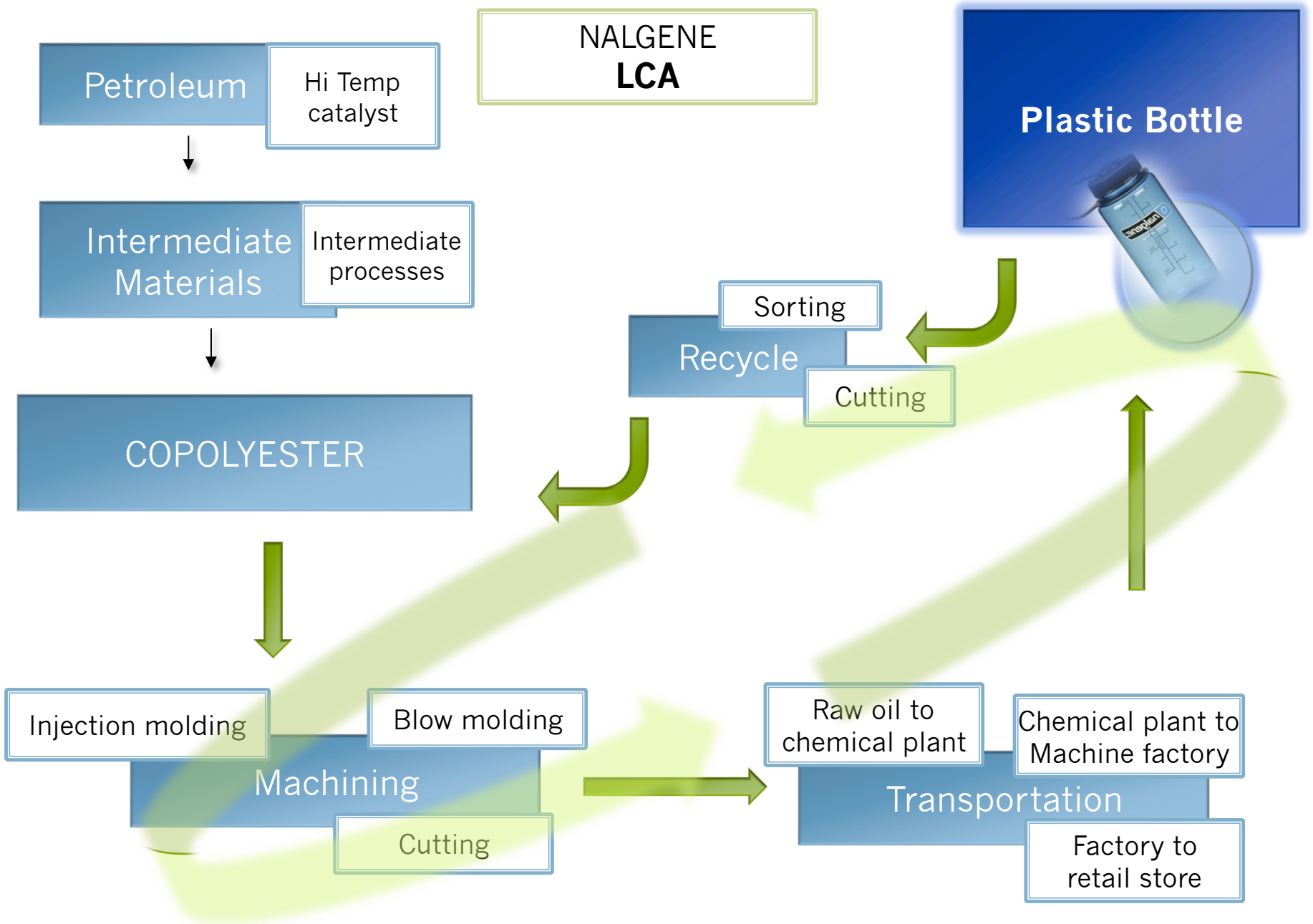


- Used in Polycarbonates
- Has Many Harmful Effects
- Now – BPA Free (Transition)

Nalgene

- One of the first
- Leader
- Largest market share
- BPA Free
- **Copolyester** instead of polycarbonate





Okala Impact Assessment

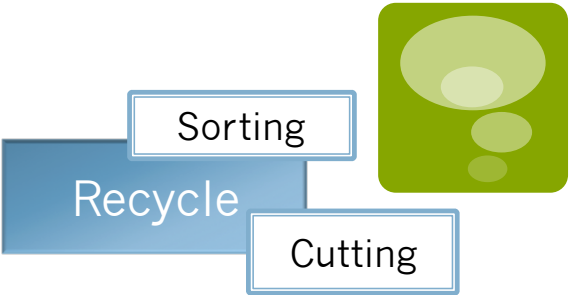


Bill of Materials Processes	Amount	Unit	Okala Factor	Unit	Okala Impact
Polycarbonate	0.375	lb	36	/lb	13.5
Blow/Inj. Molding	0.375	lb	9.4	/lb	3.525
Transport	(0.375) X (2717)*	lb-mile	0.00086	/lb-mile	.877
Total					18.17
Recycle	-	-	-	-	.265

* Distance from NY (factory) to SF (store)

Copolyester
(Calculations based on
Polycarbonates)

13.5

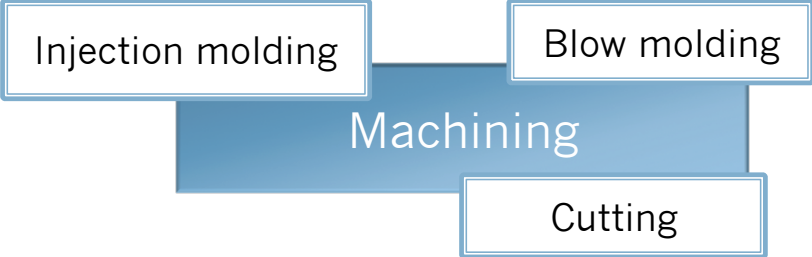


0.265

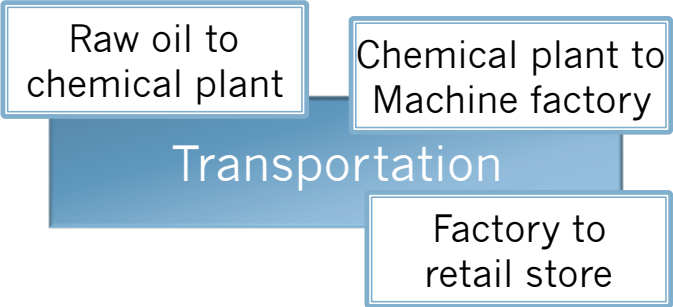
Plastic Bottle



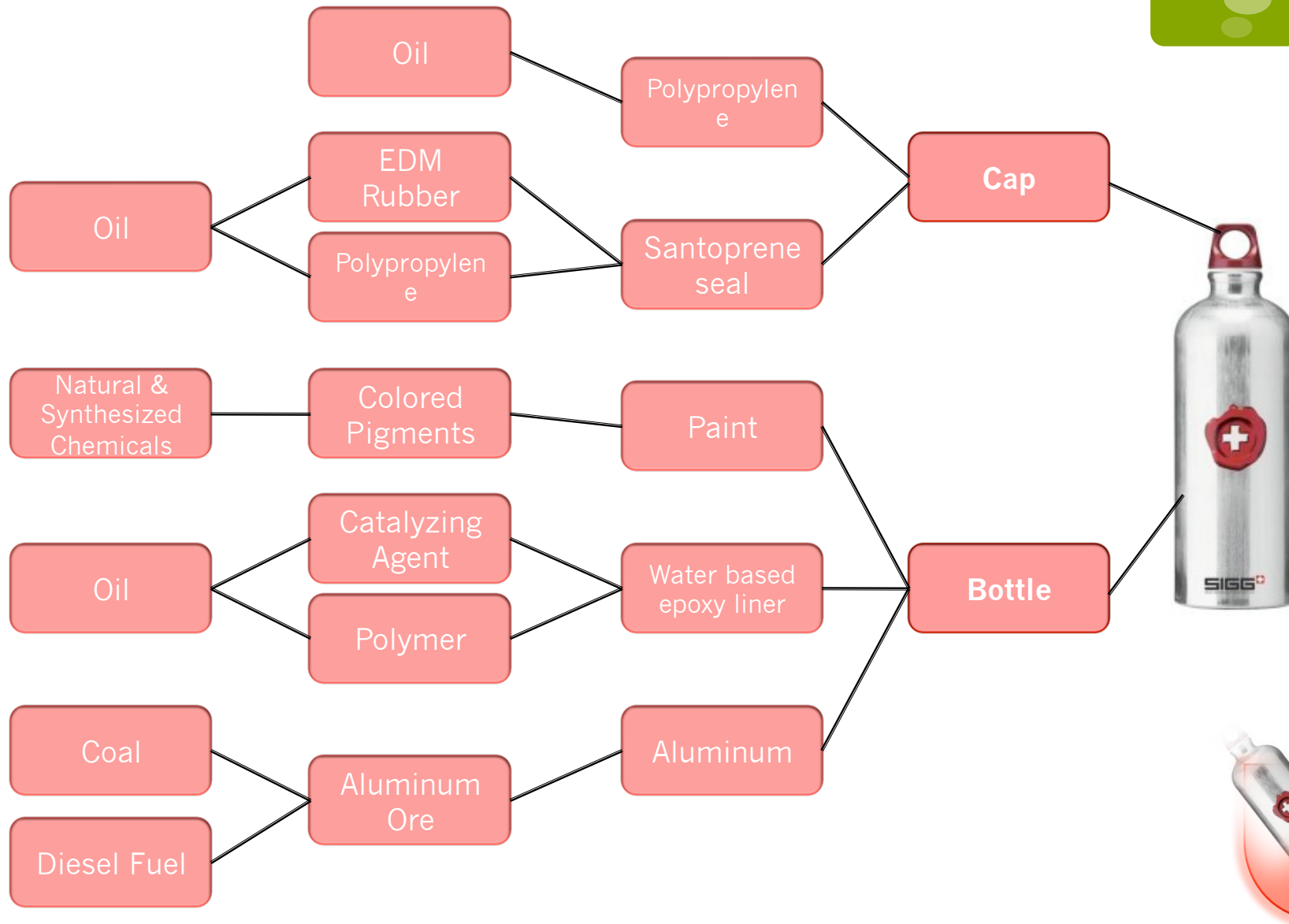
3.525



0.877



What goes in a SIGG bottle?



Sigg Aluminum Bottle



Transportation



- Western Australia → Switzerland
- Frauenfeld, Switzerland → Bremerhaven, Germany (560 miles)
- Bremerhaven, Germany → Houston, Texas
- Houston, Texas → Stanford, CA (1,900 miles)



SIGG

Okala Impact Assessment



Bill of Materials	Amount	Unit	Okala Factor	Unit	Okala Impact
Aluminum, primary	.28125	Lb	130	/lb	36.5625
Metal extrusion	.28125	Lb	4.4	/lb	1.2375
Polypropylene	.04375	Lb	13	/lb	.5687
Injection molding	.04375	Lb	10	/lb	.4375
Truck 16 ton	.32500	Lb	2.4	/ton*mi	.8700
Tanker ship	.32500	Lb	.13	/ton*mi	.2680
Total					39.9402



The Winner is



NALGENE vs. SIGG

Use



NALGENE

- Transparent
- Plastic odor
- Microwavable
- Dishwasher safe
- Freezable
- Hot Drinks fine
- Cost: \$15

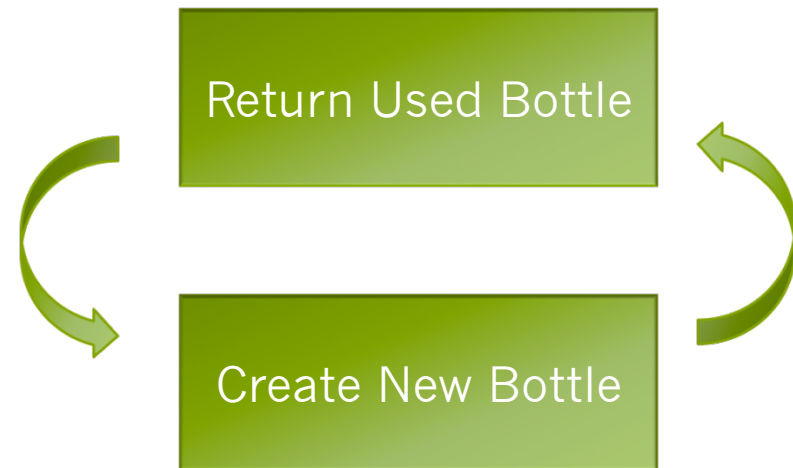
SIGG

- Customizable
- Odorless
- Not Microwavable
- Not Dishwasher friendly
- Not Freezable
- Hot Drinks not recommended
- Cost: \$25

Improvements to Reusable Bottles



- Reduce materials required
 - Thinner wall thickness
 - Change shape (same volume/less materials)
- Replace with recycled materials
 - Recycled SIGG Okala Impact ~9
- Replace materials
 - Odorless yet still transparent?
 - Conformable material
 - Lighter materials
- Create a system to return dented/cracked/damaged bottles to manufacturer



Rethinking Reusable Bottles



- Easier to use
 - Collapsible bottle
 - Attachment devices
 - Installing more bottle holders in user environments (cupholders in desks)
 - Installing more water appliances in highly populated areas
- More incentives for use
 - Discounts for using reusable bottles (soda, water, juice)
- More stylish bottle
 - Customizable shapes
 - Bottles that can function as drinking cups within home (cap for on-the-go)

